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AN OUTBREAK OF OVINE COCCIDIOSIS

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INTRODUCTION

Clinical coccidiosis would seem to be a rare disease of sheep in Britain, for the literature contains few references to its occurrence. M'Fadyean (1896) describes an outbreak in lambs two to three months old associated with a mortality of 10 per cent., and Steward (1952) records a "very acute explosive outbreak" in 145 sheep. However, the incidence of coccidial infection of sheep, as reflected by the voiding of oocysts without clinical disease, appears to be high. Thus Richardson (1939), in Scotland, found oocysts in a high proportion of sheep faeces from each of four farms from three districts, and in a lamb from a fourth district. He carried out weekly faecal examinations on a group of lambs from birth to four and a half months, in which there was no evidence of clinical disease, but the presence of a number of species of coccidia, including those accepted as potential pathogens, was detected. Hall (1931) produced similar evidence for Nigeria and records infection in 46 of 52 randomly selected sheep, despite the lack of any record of clinical disease in the territory. In fact, it is well recognised, when concentration methods for helminth egg counts are used, that oocysts may be discovered in a large proportion of ovine faecal samples.

In the U.S.A., clinical coccidiosis seems to occur much more frequently. Curtice (1892) first recorded the disease in America, and since then Martin (1923), Newsom & Cross (1930, 1931) and Deem & Thorpe (1940), among others, encountered natural cases, while Christensen & Foster (1943) described the experimentally induced disease. Richardson (1939) points out that, in some reports, other cases of disease were not definitely excluded; for example, the febrile symptoms and the lesions reported by Newsom & Cross are difficult to reconcile with those usually associated with uncomplicated coccidiosis. However, the criticism is not generally applicable and coccidiosis is recognised as a real hazard to feeding lambs (Hagan, 1947).

In view of the apparent rarity of clinical coccidiosis of sheep, in Britain, and the contrasting high incidence of subclinical infection, it is thought worth while to record this outbreak and it is felt that the information collected is sufficient to define the syndrome to some extent, and perhaps to throw some light on the conditions governing the appearance of the disease.

DESCRIPTION OF THE OUTBREAK

The outbreak occurred in early April on a farm in Lincolnshire in a flock of 300 ewes and 400 lambs three to six weeks old. Coccidiosis had been diagnosed in lambs on this farm in the preceding spring.

The sheep were running on a rather bleak hill, devoid of natural shelter, and with artificial cover provided only for newly lambed ewes. The weather had been cold and wet for several weeks.

One lamb was received at the laboratory for *post-mortem* examination on April 2nd. Coccidiosis was diagnosed, and the farm visited next day.

Husbandry.—The pasture was a third-year ley of 55 acres. In its first year it had been lightly stocked with cattle and sheep. In the second year it had been used for hay, then weaned lambs were grazed on the second growth for three weeks. For use as a lambing paddock in 1952 it had been subdivided into nine approximately equal enclosures.

The ewes were folded over beet tops until a week prior to lambing, when they were transferred to one of the enclosures and were shepherded each night into adjacent lambing yards. The sheep received mangolds, silage and corn as a daily supplement to the pasture.

Lambing commenced in the last 10 days of February. Eventually, there were three flocks, of something under 100 ewes each, one containing singles and the other two being made up of twin lambs. The three flocks were rotated fairly regularly, so as to remain for not longer than eight days in a particular enclosure and to come back to it after about 14 days.

The mangolds were fed on the ground and the corn in low troughs, in which the lambs were able to stand. The pasture was very short and somewhat soiled. Apart from some of those affected, however, all sheep were in excellent condition and there was no reason to criticise the quantity or quality of the diet as a whole.

Clinical Symptoms.—On April 3rd diarrhoea was evident in about 18 lambs in one twin flock (10 per cent.); the other twin flock was less severely affected and the singles seemed to show still less evidence of the disease.

The symptoms consisted of soiling about the breech and the voiding of dark fluid faeces. True dysentery was absent, and neither the shepherd nor the owner noted blood in the faeces at any time. Depressed demeanour and inappetence was apparent in six of the affected lambs, but they showed no evidence of fever and temperatures were normal. The remainder of the infected lambs showed no constitutional symptoms and six ewes suffered from diarrhoea, although they were normal in [illegible] respects. There were several other lambs, classed as convalescent by the shepherd, which had been scouring but were now recovering without treatment.

On April 9th, when revisited, the general clinical picture in the flock was unchanged.

The final visit was made early in July. Dry weather and consequent lack of pasture growth had speeded up the grazing rotation so that the stock were moved after four to five days, but otherwise the management had not been changed in the meantime. There was no sign of clinical disease and most lambs were in excellent condition. About 60 lambs had shown symptoms during the three weeks of the outbreak and of these 20 had been dosed with sulphamezathine with apparently good results. The course of the clinical disease in untreated individuals had been from three to eight days, but some stunting typically followed severe infection.

Oocyst Concentration in Faecal Samples.—Oocyst and helminth ova counts of faeces were undertaken, using the Stoll method. No correction was made for the fluid nature of the faeces. Results obtained from the affected flock are shown in Table I.

TABLE I

SAMPLES TAKEN IN APRIL, 1952

Animal		Clinical condition	Oocyst count per gramme of faeces	Worm egg count per gramme of faeces
Lamb	12,866	Died. Severe enteritis	1,500,000	<100
,,	75	Marked diarrhoea. Depressed	125,000	<100
,,	57	Marked diarrhoea. Depressed	158,000	<100
,,	43	Marked diarrhoea ...	258,000	1,000
,,	15	Diarrhoea	29,000	<100
,,	4	Diarrhoea	64,000	<100
,,	77	Diarrhoea	41,500	500
,,	36	Convalescent. Diarrhoea ceased	60,500	1,000
,,	31	Convalescent. Diarrhoea ceased	19,000	<100
,,	22	Convalescent. Diarrhoea ceased	18,500	<100
,,	19	Normal (good condition)	14,000	500
Ewe	13	Diarrhoea	223,500	<100
,,	14	Diarrhoea	22,500	<100
,,	Ag	Slight diarrhoea	11,000	<100
,,	12	Diarrhoea	8,000	<100
,,	3	Normal	3,000	<100
,,	2	Slight diarrhoea ...	1,000	<100
,,	1	Normal	<100	<100

Samples taken in July, 1952

Animal		Clinical condition	Oocyst count per gramme of faeces	Worm egg count per gramme of faeces
Lamb	82	Normal	35,500	<100
Ewe	25	,, ...	17,800	<100
Lamb	84	,, ...	6,200	<100
Ewe	26	,, ...	200	<100
Lamb	85	,, ...	200	<100
Lamb	81	,, ...	100	<100
Lamb	83	,, ...	<100	<100
Ewe	21	,, ...	<100	<100
,,	22	,, ...	<100	<100
,,	23	,, ...	<100	<100
,,	24	,, ...	<100	<100

Identification of the coccidial species represented by the several oocyst types was based on the description by Christensen (1938). *Eimeria arloingi* was predominant with *E. parva* and *E. faurei* also present, but *E. intricata* was not observed. Differential counts from three samples are given in Table II.

TABLE II

DIFFERENTIAL OOCYST COUNT IN THREE ANIMALS EXPRESSED AS A PERCENTAGE

Animal (lambs)	Oocyst count per gramme faeces	*E. arloingi* per cent.	*E. faurei* per cent.	*E. parva* per cent.	Indefinite and intermediate forms per cent.
12,866	1,500,000	38	20	34	8
43	258,000	80	—	14	6
36	60,500	71	14	6	9

Post-mortem Findings.—The single lamb examined was well grown and fat. There was evidence of diarrhoea, but not dysentery. It was noted particularly that kidneys, serous membranes, pericardium and heart were normal. The sole lesion was in the small intestine, where there was a severe diffuse enteritis, involving the middle third of its length. No discrete lesions, as recorded in coccidiosis by M'Fadyean, Hall and others, were noted, but the affected wall was notably thickened. The small intestine was almost empty of food material. The large intestine was normal and the abomasum and intestine contained a few *Trichostrongylus spp.* worms, but certainly not in significant numbers. Superficial scrapings of small intestinal mucosa contained enormous numbers of oocysts. Bowel contents were not tested for toxins.

Histopathology.—Sections of affected gut were stained with haematoxylin and eosin or by Leishman's method. In the mucosa, and particularly in the epithelial layers, were abundant coccidial bodies, and although distribution of these was irregular, some crypts of Lieberkuhn and adjacent villi were so heavily parasitised that coccidia formed an almost continuous superficial layer. Distribution in other areas was more sparse, but whether heavily or lightly parasitised, the epithelium tended to lose its simple columnar structure in favour of disorganised layers of small cells.

Among the coccidial bodies, macrogametes and late macro- and micro-gametocytes were recognisable. There was a large proportion of forms with irregular staining and nuclear and cytoplasmic aggregations which could not positively be identified. These may have been early gametocytes. Certain of them may have been early schizonts, but the absence of recognisable mature schizonts seemed to make this unlikely.

DESCRIPTION OF THE 1951 OUTBREAK

In mid-April, 1951, following cold wet weather, there had been a similar outbreak of disease in lambs on the same farm. The symptoms differed from those of 1952 only in their greater severity and morbidity was at least 35 per cent., but, as in 1952, only one lamb died.

Coccidiosis was diagnosed on the presence of abundant oocysts in a simple faecal smear and was confirmed by *post-mortem* examination of the dead lamb. All lambs were treated with ½ to 1 gramme of sulphamezathine *per os*, once a day for three successive days. Improvement was so marked that the original intention to repeat the course after four days was abandoned.

Diagnosis.—Clinical symptoms in this outbreak were those of an afebrile enteritis. Very high faecal oocyst counts from affected sheep included potentially pathogenic species and indicated massive coccidial infection. At *post-mortem* examination the sole lesion was a severe inflammation of the small intestine which was associated with widespread coccidial invasion of the mucosa. The husbandry, also, was compatible with the occurrence of clinical coccidiosis. Under similar conditions in the previous year, disease in lambs on the farm had been diagnosed as coccidiosis.

The worm burden discovered at autopsy was not significant. The ova counts on the 18 sheep sampled during the outbreak were low and of these only two, which reached the moderate level of 1,000 eggs per gramme, could be considered at all significant. The outbreak terminated without anthelminthic measures. The rotational grazing system, although imperfect, and the adequate feeding, appeared to discourage worm infestation in the lambs. There remains the bare possibility of immature worms causing the enteritis, but the subsequent flock history, the low ova counts in ewes as well as lambs, and the failure to note the worms in scrapings of the small intestines make this unlikely. Clostridial entero-toxaemia seems excluded by the negative *post-mortem* findings and by the fairly long course of the disease which typically terminated in recovery. Similarly, the *post-mortem* picture and the comparatively mild afebrile symptoms

give little support to a diagnosis of bacterial enteritis of any kind. Finally, there had been no change of feeding to cause a "non-specific" or a "digestive" enteritis and the lambs recovered on an unchanged diet.

It is concluded that the diagnosis of coccidial enteritis is valid.

Pathology.—There is general acceptance that the principal lesion in ovine coccidiosis is an enteritis of the small intestine. In this connection some authors describe small discrete lesions which, as Thomson & Hall point out, fall into two classes. Curtice (1892) and Martin (1923) record small flattened white or blue spots: Nocard (1893), M'Fadyean (1896), and Hall (1931) record reddish, sessile pyriform tumours, and it has been suggested that the flattened spots are aggregations of schizonts and merozoites (Richardson, 1948) or macrogametes (Hagan, 1947). There is even doubt if they are coccidial at all. Altogether it seems reasonable that the discrete lesions appear in a chronic phase of the disease representing a late reaction of host and/or parasite and such a view could explain their absence in lamb 12,866.

It would be tempting to ascribe differences in the features of outbreaks of coccidiosis to species involved. However, in the Lincolnshire outbreak the limited species identification (Table II) was compatible, as far as it went with the accepted representation in clinical coccidiosis. It is usual to find a mixed infection (Richardson) and to find *E. arloingi* well represented (Deem & Thorpe; Hagan). The three species present have been encountered with others in British sheep by Richardson, who later sounded the warning that the validity of ovine coccidial species must remain doubtful while it depends wholly or largely on oocyst features without a study of pure infections.

Symptoms.—Neither in 1952 nor in the more severe outbreak of 1951 was blood observed in the faeces. True dysentery is considered to be typical of coccidiosis, but its incidence in affected sheep is difficult to determine. M'Fadyean, in Britain, and Christensen and Deem & Thorpe, in America, do not refer to this symptom, but Martin and Newsom & Cross mention it as prominent and Steward records its presence. In the Lincolnshire outbreak, enteritis in the small intestine was not haemorrhagic, nor had the faeces the tarry nature associated with high intestinal haemorrhage.

The death of lamb 12,866, despite its excellent bodily condition, was interesting and the suggestion of rapid, acute disease was difficult to reconcile with symptoms in the other lambs, although Richardson recognises an acute type of coccidiosis. Histopathology and oocyst count suggested that this lamb succumbed to a massive coccidial invasion, which may have produced some kind of anaphylactic shock.

Faecal Oocyst Counts.—The results in Table I merit consideration, particularly in view of the scarcity of more complete quantitative investigations into ovine coccidiosis, although it is appreciated that individual variations in oocyst counts are marked and that, for firm conclusions to be drawn, observations on a wider scale would be needed.

Steward (1952) records at the height of clinical disease, counts each bulked or averaged from five or six sheep, equivalent to 320,000, 80,000, 140,000, 54,000 and 600,000 oocysts per gramme. Christensen & Foster (1943), on the third day of symptoms, found samples each bulked from four sheep, to contain 137,000 o.p.g. and 67,000 o.p.g., the latter rising on the fifth day to 220,000 o.p.g.

For comparison, the arithmetic mean of clinical cases in Table I is 208,400 o.p.g., although it is appreciated that this figure is greatly increased by the recorded oocyst count of one animal. Of the three affected animals under 20,000 o.p.g., none was severely affected and all were ewes, possibly possessing some immune response which would influence oocyst counts. These results lead to the conclusion that clinical coccidiosis in a flock is accompanied by high oocyst counts, probably of the order of 100,000 o.p.g. As a corollary, the absence of such a finding is of diagnostic value.

The significance of a positive finding of high oocyst counts is less clear. Records from flocks free from clinical coccidiosis are limited. The description by Richardson (1939) is largely qualitative, but suggests only moderate concentration—probably under 5,000 o.p.g. A strong impression from incidental noting of oocysts in routine helminth ova counts is that such oocyst concentrations in presumably normal flocks never exceed 2,000 to 5,000 o.p.g., and are usually very much lower.

There is striking contrast between counts from clinical cases in Table I and counts from flocks where clinical disease is unknown. However, further investigation would be needed to determine whether high counts could exist (or at least persist) in a flock without clinical disease, reflecting a "potential outbreak" state, where husbandry favours massive infection, but precipitation of symptoms awaits chance variation of the environment which would upset the balance of infection and resistance. The results in Table I are not relevant to this point: they merely indicate that symptomless high counts can occur together with a following clinical disease.

Meanwhile, it seems safe to conclude that counts greater than 100,000 oocysts per gramme of faeces in the presence of appropriate symptoms are strong diagnostic evidence of clinical coccidiosis in a flock—and to remember that the diagnostic level may be as low as 10,000 to 20,000 o.p.g.

Epidemiology and Prophylaxis.—The fact that lambs 82 and 84 and ewe 25 (Table I) showed such high oocyst counts three months after the outbreak suggests the likelihood of a high carrier rate having existed at lambing time amongst the ewes, some of which were survivors of the 1951 outbreak. Crowded conditions probably increased both the carrier rate and the potency of the infection at the time, and the fact that lambs habitually entered the feeding troughs is also noteworthy. Under these conditions the flock would readily become generally infected.

In 1951, and again in 1952, harsh weather preceded the outbreaks and may have been an important predisposing cause of clinical disease. The importance attached to contributory factors is discernible in previous reports of ovine coccidiosis.

Prophylactic measures should aim to minimise, or control, mass infection and maintain host resistance. Total elimination of carriers implying 100 per cent. drug efficiency and complete prevention of reinfection is probably no more feasible than in helminth infestation. More practicable is alteration of husbandry towards better hygiene and lighter stocking. Rotational grazing merits investigation, but is not promising in view of the characteristics of the parasites themselves.

The analogy of coccidiosis in birds suggests that, for the "potential outbreak" flock where environment necessarily favours infection, a fruitful approach to the problem of prophylaxis might lie in allowing an immunity associated with mild infection to develop.

Summary

An account is given of an outbreak of clinical coccidiosis in 400 lambs, among which the morbidity rate was 15 per cent. and one lamb died. Symptoms and *post-mortem* picture were of an afebrile enteritis without true dysentery. Clinical cases had very high faecal oocyst counts, but some "carriers"

and convalescent animals not showing symptoms also had high counts exceeding those of some of the milder clinical cases. It is concluded tentatively that the presence or absence of faecal oocyst counts of 100,000 o.p.g. in conjunction with clinical observation provide valuable diagnostic evidence of coccidiosis in a flock. In the aetiology of the outbreak, mass infection initiated by a high carrier rate among the ewes at lambing and facilitated by indifferent husbandry and harsh weather as precipitating factors were important. Appropriate prophylactic measures are discussed.

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RABIES IN ALBERTA: ALL DOGS TO BE CONTROLLED

The Calgary correspondent of *The Times* states that the area in which the movement of dogs is restricted as a precaution against the current outbreak of rabies has been extended to include the whole of Alberta. Originally only the far northern areas were affected; this was later extended to include about half the province as the disease continued to spread southwards. " Under regulations made by the Dominion Government, dogs throughout Alberta must be kept on leash or otherwise confined. The penalty for infringement varies from a minimum fine of $50 to a maximum of $500 and some authorities have ordered the shooting of stray dogs at sight.

" The supply of vaccine for dogs, hitherto scarce, is now sufficient to permit general vaccination by veterinary surgeons in private practice. Previously vaccine was obtainable only if it was suspected that a dog had been exposed to infection.

" In the Far North, as part of the campaign to exterminate rabies-carrying wild life, a trapline 3,300 miles long and equipped with poisoned bait is now in full operation. In more settled areas a determined campaign to reduce the number of coyote is in progress. One hunter has killed 70 coyotes since the campaign started: another killed 29 in two days."

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FOWL PEST: MOVEMENTS OF POULTRY TO AND FROM SCOTLAND

The Ministry of Agriculture, stating that some illegal movements of poultry from England into Scotland have come to light recently, remind poultry keepers that it is an offence under the Live Poultry (Restrictions) Order, 1952, to move any poultry (domestic fowls, ducks, geese and turkeys), day-old chicks or hatching eggs from England or Wales into Scotland. Birds sent from Scotland to England for show or trials are not allowed to be sent back to Scotland. The purpose of the Order is to prevent the introduction of fowl pest into Scotland.

SOME OBSERVATIONS OF GRAZING BEHAVIOUR FOLLOWING UPON MANURIAL TREATMENT OF CONTRASTING PASTURE TYPES

BY

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Implication of leys as a causal factor of physiological disturbance within the grazing animal is widespread. The indictment is rather vague : possibly failure on the part of the agronomist to integrate, in terms of the animal, the enhanced calorific output of ley components has intensified the untoward sequelae left to the care of the veterinarian. Both the behaviour and reaction of the grazing animal to a purely productive environment, with no provision for the complementary protective intake, have resulted, among other modifications, in the grazing of the ley alongside a permanent pasture. The contrast thus afforded tends to be regarded floristically. Bound up with the establishment of the ley, and the maintenance of the old sward, is the further problem of manurial treatment, the corrective application of which has rarely, if ever, been studied as an optimum in relation to the grazing animal, but always in terms of existing soil levels and crop output. Thus the inter-relationship of soil fertility levels and the floristic pattern of grass components forms the true ecological background, against which the animal is placed as the unit of conversion.

During 1948 an investigation of some " problem " herds with Dr. R. E. Hughes, of Cambridge—then at Bangor—suggested that the appreciation of an efficient phosphate status necessary for production and well-being of a productive herd was not then widely realised. (Hignett has drawn attention to this aspect in relation to infertility.) Equally so, the investigation of other herds (some with Shaw and Thompson of the Cattle Breeding Centre, Ruthin) indicated anomalies, and odd patterns of behaviour suggesting that there appeared to be little appreciation of the influence of corrective manurial treatment as affecting the grazing animal.

The following simple field trial was accordingly set up, to observe the general response, if any, of the grazing animal to phosphatic treatment of both an old sward and a new ley, using in sections :—

High-grade basic slag.
South African rock phosphate.
Super phosphate.

Site. Vale of Clwyd, Ruthin.
Two adjoining fields each of four and a half acres, total nine acres.

Soil analysis levels. Lime CaO ... satisfactory.
Potash K_2O ... moderate.
Phosphate P_2O_5 ... low.

Field A. Ploughed autumn, 1948, leaving indigenous strips untouched and after suitable cultivation dressed sectionally in May, 1949, with
basic slag ... 10 cwt. per acre
rock phosphate... 8 „ „
super phosphate 5 „ „
then sown with the following grass seed mixture per acre :—

Italian rye-grass	1 lb.
Danish roughstalked meadow grass	2 „
Danish meadow fescue	14 „
Timothy S 48	6 „
Creeping red fescue S 59	2 „

Perennial rye-grass S 23 ... ... 2 „
Kent wild white clover ... ... 1 „
with the inclusion of herbal strips of burnet, chicory, rib-grass, sanfoin, yarrow, in each manurial section.

Field B. An old indigenous sward, unploughed within memory ; this was dressed in two sections with basic slag and rock phosphate, respectively.

A corner of each field, intersected by ditches and, therefore, somewhat inaccessible, was left entirely alone. Ungrazed for years, the herbage had reverted, becoming very coarse and long.

Both fields were closed and a cut of hay taken from the old pasture late in June. Although criticism may be levelled at the type of animal chosen, horses were used for observation, their habits over this ground in the past having been noted. The stock comprised two thoroughbred mares with foals at foot, half-bred yearling filly, and a pony gelding four years old. Whilst awaiting the establishment of the ley the animals were accommodated on a mixed grazing of eight acres made up of old and new pastures, none of which had been top dressed ; the ley had been put down the previous season, by direct reseeding with no manurial top dressing. A normal period of grazing was recorded.

Early in July, 1949, the horses were taken to the new ley in Field A and left to graze contentedly. The following weeks were uneventful and whilst no marked preference was shown for any particular phosphate section, the indigenous areas left undressed were being grazed with increasing attention. Then bark stripping was noticed, also the eating of pieces of dead wood (fallen branches), whilst young hazel and willow, shoots and leaves, were being plucked.

Three weeks after being turned into Field A, the barrier to Field B was removed, and the entry to the old pasture proved quite welcome. The fast and intense grazing that followed could not be accounted for by general hunger, and indicated a specific need. Nearly a week elapsed before a return visit was paid to the ley, where they remained for a short period before returning to the old pasture, after which several daily alternations were made. The bark stripping, etc., became less noticeable when the second field was opened up but within a fortnight again became evident. The younger horses were frequently seen pawing the turf until a small depression was made exposing the earth which they licked and muzzled with some relish. Despite good keep the degree of hedgerow picking increased. A most varied collection of plants was eaten. Little attention was paid to the herbal strips.

Fig. 1.—Two-year-old filly gnawing dead tree trunk now almost plane surface.

Early in October the foals were weaned and later the older horses moved to an old pasture of 14 acres that earlier in the season had been grazed by bullocks ; this had been the custom for some years. Instead of the customary gallop of loose horses when put into a new field, they quickly settled down, concentrating on the foggage clumps left by the bullocks ; exactly how long this clump grazing persisted was not known.

Two days after weaning, the foals, housed in a large loose-box, were supplied with a proprietary mineral lick ; placed in position in its holder late in the evening, the following morning teeth marks were visible where pieces had been bitten off. Nine days later it had been consumed. The composition of this lick was given as Ca 3·4 per cent., P 0·65 per cent., Na 35 per cent., Cl 55 per cent., Fe 0·25 per cent., Cu 3,000 p.p.m., Co 300 p.p.m., Mn 170 p.p.m., KI 850 p.p.m.

The following season sections of both fields were top dressed with muriate of potash and half an acre of the ley with compound fertiliser (N.K.P.). Part of the indigenous herbage in Field A was also top dressed with the compound fertiliser.

Access was at first restricted to the old sward Field B and three weeks later the ley in its second year was made available. A similar pattern of behaviour was noticed, with no marked preference for any top-dressed section. The preference for the undressed indigenous strips was marked, whilst the top-dressed sections remained practically untouched so that a line of demarcation became apparent between the closely grazed untreated indigenous area and that part of this area that had

Fig. 2.—Willow tree showing areas of bark stripped by horses.

been dressed with compound fertiliser. It was evident that in the circumstances this inferior herbage after dressing proved to be less acceptable. Bark stripping, hedgerow browsing and gnawing timber was if anything more pronounced.

An adjoining 15 acres of stubble that had been left uncultivated was made available during the summer. This, now an agricultural wilderness of indigenous herbage and weeds, was added to the grazing area by making a wide gap in the hedge. The inquisitive animals were soon through and commenced an intensive grazing of bents, Yorkshire fog, equisetum and, in particular, dandelion, which were nipped out leaving the crown or, where the soil was loose enough, plucked out and eaten whole. The stripping of bark continued for about a week, after which little fresh evidence was found.

Apart from walking over to a shed in Field B during the heat of the day, followed by a leisurely return in the cool of the summer evening to the 15-acre wilderness, the stock continued grazing and picking for four weeks, when they again commenced grazing Fields A and B, eventually undertaking a rhythmic rota of the three areas. With access to the three areas grazing remained normal ; no bark stripping, licking of earth or twig picking was detected.

Access to this indigenous herbage on soil at a lower level of fertility appeared to afford the complementary intake that the animals sought.

Fig. 3.—Selective grazing: indigenous strip—behind lath top-dressed area uneaten; in front of lath herbage eaten down. Area in front of lath was left undressed.

The experiment was continued in 1951, with immediate access to both fields. Bark stripping, earth licking, twig snapping were not as marked and as the adjoining wilderness was again available early access was readily accepted, and normal grazing maintained between both fields and the 15 acres. The poor indigenous strips in Fields A and B were practically disregarded.

The outstanding feature appeared to be the search for indigenous herbage on soil at a lower or natural level of fertility, *i.e.*, undressed.

Similar patterns of behaviour have been observed among cattle and sheep but not quite as marked as in this of horses.

Further Observations.—During the spring, 1952, Field A was again ploughed and reseeded with a similar seeds mixture, but the 2 lb. of perennial rye-grass was replaced with meadow foxtail : wild white clover was omitted from one acre sown down. Herbal strips were again included and the former indigenous strips and areas left unploughed. No phosphates were applied. Grazing was restricted to Fields A and B.

Through absence from station the grazing period was not observed as in former years. When seen in early September the stock, now reduced to four in number, looked well. The reseeded portion had been evenly grazed, but only part of the indigenous strips had been eaten down, the very inferior area showed very little evidence of having been eaten ; the herbal strips had been close grazed, however. No evidence of bark stripping could be detected, and the hedgerows themselves gave little evidence of having been disturbed. The adjoining old pasture had the typical appearance of patchy selective grazing, whilst the perimeter gave little indication of having been touched.

Fig. 4.—Group at end of 1950 grazing experiment in Field A.

Discussion

The grazing behaviour briefly outlined proved entirely different from that noticed in previous years. The hedgerows previously overgrown—rather more than good husbandry would have allowed—and two small areas of very poor and rough pasture had rarely been touched. Following the top dressing and inclusion of a ley the diligent search for hedgerow herbage and that growing between the briars was rather evident, perhaps more so by the young stock. There appeared no floristic evidence to account for this desire ; both fields and the old stubble were examined by the ecologists Professor Alun Roberts, of Bangor, and Dr. R. E. Hughes, of Cambridge.

The effects of manurial treatment are at least twofold : an alteration of the species contribution to the sward, and again in the chemical composition of the individual species members. Brynmor Thomas and his co-workers have undertaken the analysis of the major and some minor ash com-

ponents of pastures at Cockle Park where plots have been subjected to manurial treatment over a period of 50 years. Whilst the influence of *p*H affecting the uptake of minor components or trace elements is now widely appreciated, the effects of varying phosphatic and potash dressings—as also the nitrogenous fertilisers—upon the minor elements do not seem to be realised so fully. The undressed or control plots investigated by Thomas at Cockle Park show a higher trace element content than the treated plots, but the possibility of excessive uptake (of undetermined elements) cannot be disregarded in the treated plots. A later publication gives the results of their investigation of the ash constituents of 16 herbage species in relation to stage of growth. These note that meadow fescue was richer in mineral elements than the other grasses examined.

That such behaviour can be explained by ash component alone seems hardly feasible ; with comparatively little known of the biochemistry of pasture components, any specific reasoning, apart from being incomplete, may be erroneous. The nature of the behaviour recorded appears to suggest some positive factor—one is sometimes tempted to consider a mild phase of sensitisation, which is relieved by access to a " diluent herbage " if such a term is permissible for this undressed indigenous herbage.

Although the older horses looked well, access to the rough resulted in improvement of the condition of the young stock ; they seemed to spend more time on it than did the older horses.

This pattern of behaviour afforded some explanation for rather peculiar grazing noted in previous years in a widely distributed variety of herds, and whilst the ley was being soundly castigated little if any thought was given to the effect of varying manurial treatment. The necessity for " contemporaneous access " to a wide variety of pasture types has been repeatedly put forward by the great pioneer Sir George Stapledon. Where generous top dressing has been undertaken the animal appears also to require access to an area of lower fertility. Soil requirements are assessed from analysis of samples taken at depth and through the soil profile. The immediate corrective application, if heavy, affords for a time a very heavy superficial concentration, which before leaching and fixation may be of greater significance to the grazing animal than to the sward or ley components Whether time and further research will favour the method of " little and often " as the optimal dressing with regard to the grazing animal, is yet to be seen. Observations from other field trials suggest that such a method is followed by less disturbed grazing.

Summary

A simple grazing trial with horses afforded access to old and new pasture top dressed with basic slag, super phosphate and rock phosphate revealed no preference for any particular area, but resulted in a very marked desire for any undressed indigenous herbage, eating of young twigs and a pica for soil, dead wood, sticks and tree bark. Access to a larger area of indigenous herbage and " rubbish " resulted in a gradual return to normal grazing.

Acknowledgment.—Acknowledgment is made to the assistance given by Sir Thomas Dalling : to both ecologists Professor Alun Roberts, of Bangor, Dr. R. E. Hughes, Cambridge, and to colleague W. B. Shaw for some of the photographs.

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CLINICAL COMMUNICATIONS

THE SUCCESSFUL TREATMENT OF SEVERED SUPERFICIAL AND DEEP FLEXOR TENDONS IN A DAIRY COW

ERIC I. WILLIAMS, M.R.C.V.S.,
St. Clears, Carmarthen,
AND
E. T. REES EVANS, B.Sc., M.R.C.V.S.,
University College of Wales, Aberystwyth

Introduction.—The treatment of severed tendons in the ox has not received much prominence in the British veterinary literature. The few cases we have encountered in the past, usually involving the flexor tendons of the hind limb, were slaughtered owing to the difficulty of effecting immobilisation sufficient to attempt treatment. Tendons are nevertheless reputed to have a good capacity for repair (Francis, 1941).

The cause of such severance is often obscure, but occasionally the attendant will volunteer evidence of having tapped the hind leg lightly with a shovel, whilst cleaning out the byre, to cause the animal to move, or else, that the cow has kicked and hit the shovel.

Owing to the special circumstances mentioned below treatment was attempted in this case and, in view of its success, we deem it worth while reporting.

Subject.—A five-year-old Dairy Shorthorn cow that, for the six weeks prior to the accident, had been tied continuously in a stall at one end of the cowshed. The cow had calved the day before and had retained the foetal membranes.

Examination.—Examination of the animal showed the fetlock of the left hind leg resting on the floor with the toe pointing upwards. About 9 to 10 inches below the point of the hock there was a deep wound which, on closer examination, was found to extend through the skin and both superficial and deep flexor tendons. No cause for the wound was ever discovered despite close questioning of the attendant and examination of the surroundings.

The cow was a heavy milker and in view of this and its unsuitability for casualty slaughter we decided to attempt treatment.

Appliance.—Whilst an appliance for effective immobilisation of the leg was being made, the wound was cleansed and bandaged. The local welding engineer readily came along to take measurements and made, to our requirements, the appliance shown in Fig. 1. It consisted of a vertical iron bar, dimensions 17 by ⅜ by 1½ inches, slightly curved transversely. One end of the bar was welded on to a horizontal plate cut in the shape of the solar surface of the foot and possessing

Fig. 1.

Fig. 2.

sides shaped to enclose the foot. A bar, ¼ by ¾ inch cross-section dimensions, was welded across the angle formed by the upright and the plate, and this was curved to correspond to the back of the pastern in the normal position. Three straps were passed through housings as shown in the photograph. An "eye" was made in the upright to facilitate examination and dressing of the wound but this was found to have been unnecessary. It is regretted that there is not available a photograph of the appliance on the affected limb, but Fig. 2 shows it in place on a leg collected from a knackery.

Procedure.—The animal was cast and appropriately secured by ropes. The area surrounding the wound was cleansed and infiltrated with 5 per cent. procaine hydrochloride solution. An attempt made to suture the separated ends of the tendons was unsuccessful, the sutures tearing out with the least movement.

The wound was then liberally treated with sulphamezathine powder and bandaged.

The appliance was placed in position, rubber pads being inserted between the back of the leg and the iron framework to prevent sores. The straps were tightened and restraint removed.

The wound was dressed with powder on alternate days for the next fortnight and then twice weekly until healing was complete. The dressing was accomplished by releasing the top strap, and even though the cow often kicked violently during treatment, the appliance was never displaced.

Outcome.—Within four weeks the wound had healed completely, and the appliance was removed after six weeks. The foot by now rested normally on the ground but there was still considerable sagging of the fetlock. An Elastoplast bandage was applied in a figure 8 fashion to support the fetlock. Three months from the time of the injury (corresponding to the time for the herd to be turned out to pasture in the spring) the cow walked well with only a slight limp. This soon disappeared. Fig. 3—photograph taken at time of turning-out—shows the cow standing well on this leg and also the very small swelling indicated by arrow that persisted at site of injury. Now, 12 months later, the cow walks normally.

Fig. 3.

Acknowledgments.—We are indebted to Mr. Leonard Hill (Cwmdwyfran Engineering Company) for making the appliance and to Mr. J. Michael, veterinary student, for the photography.

Reference

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* * * * *

USE OF "IMPLANTIN" IN PERIANAL ADENOMATA IN AGED DOGS

Olwen D. James, M.R.C.V.S.,
Cardiff

Implantin brand of stilboestrol administered by means of Arnold's injector has been used with some degree of success in 10 cases of perianal adenomata in aged dogs.

The condition varied from one large ulcerating tumour, to complete encirclement of the anus by nodules of various size, some ulcerated and infected, and in three cases causing difficulty in defaecation.

Technique.—Pellets of Implantin were injected subcutaneously by means of Arnold's injector.

Site.—In each case, healthy tissue adjacent to the tumour mass was chosen; where the latter extended around the circumference of the anus, two pellets were inserted, one each side of the anal ring.

Subsequent Progress.—Subjects were re-examined ***14 days*** after injection—at which time all tumours showed marked regression, some smaller non-ulcerated nodules having quite dispersed. In two severe cases another tablet was injected.

Twenty-eight days after first injection, nine cases showed marked regressive changes; ulcerated areas had healed; no patient showed difficulty in defaecation.

The 10th case showed little change and a subsequent biopsy proved the growth to be carcinomatous.

Two out of nine cases showed relapses—after six and 11 months respectively—but again improved after a further injection.

The only concurrent treatment consisted in the administration of liquid paraffin and the application of acriflavine emulsion in cases having ulceration or infection.

Clinically similar cases previously treated by daily oral administration of stilboestrol in 0·6 to 1·0 mg., as advised in Mulligan's "Neoplasms of the Dog," appeared to show little improvement.

Oral doses of 2 to 4 mg. daily produced some degree of regression, but this was less marked and consistent than that produced by implants.

After oral administration, several dogs became attractive to other males, but this has not been noticed in the implant series.

Conclusions.—This method seems to be of some use in controlling perianal adenomata in cases that would prove bad operational risks. As to whether a permanent cure would result seems inconclusive, as owing to the age of the patients, most die of senility or chronic conditions before a sufficient time can elapse to confirm the results.

Weekly Wisdom

The living body and its physiological environment form an organic whole, the parts of which cannot be understood in separation from one another.—J. S. Haldane: "Mechanism, Life and Personality."

ANNOUNCING THE INTRODUCTION OF

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Extensive trials in the field and the laboratory with 'Seavac' have shown that excellent protection has been given against Swine Erysipelas.

While fully appreciating the good results given by the simultaneous method of prevention of Swine Erysipelas there are many advantages to be had by using a dead vaccine:—

1 **Protection is as good as, if not better than, the old method;**
2 **No chance of spread of infection in a clean herd;**
3 **No danger of infection to the Veterinary Surgeon while carrying out the inoculations;**
4 **One 2 cc. dose is perfectly adequate for the medium-sized pigs, but for large sows and boars a dose of 5 cc. is advised;**
5 **Only one injection is required at one time but immunity is strengthened by a second inoculation two weeks after the first;**
6 **The vaccine can be kept for 18 months, whereas the life of cultures is only of short duration;**
7 **This method is considerably cheaper.**

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ABSTRACTS

Avian Tuberculosis in Swine*

The authors describe an experiment in which two young pigs were fed, on four occasions over a period of 15 weeks, with lesions from fowls affected with avian tuberculosis. Both pigs developed positive reactions with avian but not bovine tuberculins, but no tubercle bacilli could be detected in their faeces on the one occasion they were examined.

Two weeks after the last infecting dose had been given, three small pigs were placed in the same pen with the original pigs. Twenty-five weeks later, the contact pigs reacted to avian tuberculin only.

At slaughter, the two original pigs showed calcified mesenteric lymph node lesions. Two of the three contact pigs were autopsied ; one showed mesenteric lesions, and the other submaxillary lesions. Acid-fast organisms were found in all these sites and biological tests confirmed their identity as avian tubercle bacilli. The third contact pig was not examined *post-mortem*.

The feeding and contact parts of the experiment were carried out in the same pen, but the authors believe the possibility of the contact pigs having obtained chicken material direct was too slight to be considered.

P. L. I.

* **Avian Tuberculosis Infection in Swine.** Gwatkin, R., & Mitchell, C. A. (1952). *Canad. J. comp. Med.* **16.** 345–347.

* * * * *

Ferret Response to Egg-adapted Distemper Virus*

Eight groups of three ferrets each were vaccinated with the Onderstepoort egg-adapted strain of distemper virus at varying intervals from 27 days prior to injection with a lethal challenge dose of distemper virus. The results indicate a rapid development of resistance as all ferrets appeared protected as early as two days after vaccination, although one animal died of distemper from the group which had received the vaccine 27 days before the challenge dose. The three control animals and six others which had been vaccinated simultaneously or two days after the challenge dose all died of distemper.

B. W.

* **Immune Response of Ferrets to Vaccination with Egg-adapted Distemper Virus. 1.—Time of Development of Resistance to Virulent Distemper Virus.** Baker, G. A., Leader, R. W., & Gorham, J. R. (1952). *Vet. Med.* **47.** 463–466.

* * * * *

Testing Virus-transmitting Ability of Insect Vectors*

A simple technique for feeding insects on embryonated eggs is described in relation to experiments on the capacity of insects to ingest virus from infected eggs and to transmit the infection to normal eggs or to experimental animals. The air sac of a 12-day incubated egg is located by candling and a small disc of shell is removed over this area. An open-mouthed test tube containing the insect is then inverted over the hole and the insects feed on the vascular chorioallantoic membrane by piercing the air-cell membrane with their mouthparts.

B. W.

* **A Technique Employing Embryonating Egg to Test Virus-transmitting Ability of Certain Insect Vectors.** Ferris, D. H., & Hanson, R. P. (1952). *Cornell Vet.* **42.** 389–394.

VICTORIA VETERINARY BENEVOLENT FUND

MEETING OF COUNCIL

A meeting of the Council of the Victoria Veterinary Benevolent Fund was held at No. 10, Red Lion Square, London, W.C.1, on Thursday, February 5th, 1953, when the following members were present : Professor T. G. Browne, Mr. H. W. Dawes, Major J. J. Dunlop, Professor R. E. Glover, Mr. G. N. Gould, Captain T. M. Mitchell, Professors W. M. Mitchell, C. W. Ottaway, L. P. Pugh, Captain J. W. Procter and Professor W. L. Weipers. Mr. C. W. Francis, Secretary, was in attendance.

Chairman.—In the absence through illness of Professor J. B. Buxton, President, Mr. H. W. Dawes, Vice-President, took the chair.

Minutes.—The minutes of the previous meeting, held on September 26th, 1952, having been published were taken as read and signed as correct.

Apologies for Absence.—Apologies for absence were received from Messrs. E. P. Barrett, H. Bell, Professor J. B. Buxton, Mesdames D. I. Glover, C. L. Graham (President of the Ladies' Guild), Mr. Arnold Spicer, Captains Wm. Watt, A. Whicher, Professor G. H. Wooldridge and Major W. H. Wortley.

Presentation by Mrs. M. Simpson.—The Secretary reported that at the express wish of Mrs. Mabel Simpson the ivory gavel and special block presented by her to the Ladies' V.V.B.F. Guild at Harrogate in September, 1952, in memory of her late husband, Lieut.-Colonel P. J. Simpson—the founder of the Guild—were now being kept permanently at the offices of the Fund, to be used by the Guild as and when required.

As Mrs. Simpson desired the members of Council to see the presentation, arrangements were made for this to be on view during the meeting.

Correspondence.—Letters were read from :—

(i) The Secretary of the British Veterinary Association enclosing cheque for £175 8s. 4d. for the Fund, being a proportion of the profits from the B.V.A. personal accident and sickness insurance scheme.

It was resolved " That the grateful thanks of the Council be conveyed to the members of the Association for their generous decision in making this handsome donation over to the Fund."

(ii) Messrs. Sedgwick, Turner, Sworder & Wilson, solicitors, advising the Council that under the Will of the late Mr. F. T. Trewin a legacy of £50 has been left to the Fund.

Appeal for New Subscribers

The Secretary reported that, acting on the instructions received at the last Annual General Meeting, he had written to the various Divisions of the British Veterinary Association and in the replies received a number of Divisional Secretaries had promised that steps would be taken to bring to the notice of their members the regrettable position that less than one-tenth of the profession were making an annual subscription to the Fund. They further undertook to distribute Bankers Order Forms to their members and over 500 of these forms have been sent out.

After discussion, and after considering suggestions made by Mr. G. N. Gould and Professor W. M. Mitchell, the Secretary was directed as to the further action he should take in an endeavour to keep this matter before the profession with a view to increasing the number of annual subscribers.

1953 Annual General Meeting.—On the proposition of Captain T. M. Mitchell, it was unanimously resolved " That the 1953 Annual General Meeting be held at Edin-

burgh on the same day as the Royal College of Veterinary Surgeons' Annual General Meeting and that if convenient it should immediately follow such Royal College meeting."

INVESTMENTS.

The SECRETARY reported the following transactions which the Treasurer, Mr. H. W. Dawes, had authorised since the last meeting :—

Donations Account

(i) November 25th, 1952. £400 invested in the purchase of £510 13s. 3½ per cent. War Loan at 78⅞.

(ii) December 18th, 1952. Balance amounting to £433 12s. 6d. invested in the purchase of £556 14s. 3½ per cent. War Loan at 77½.

The action of the Treasurer was approved.

ACCOUNTANT'S REPORT

The report of the Accountant, as under, was read and approved :—

The following donations have been received since the previous meeting of Council :—

	£ s. d.	£ s. d.
"Anon."		
Association of State Veterinary Officers ...	5 5 0	
Association of Veterinary Teachers and Research Workers	10 0 0	
Banffs, Moray and Nairn Kennel Association	5 5 0	
British Veterinary Association (share of Profits of Insurance Scheme)	175 8 4	
Donation from the family of the late Richard Hughes, F.R.C.V.S.	50 0 0	
East Midlands Division	25 0 0	
"In Memory of Dr. J. T. Edwards"—Students' Union Society, Royal Veterinary College, H. H. Skinner and Miss O. Uvarov	6 6 0	
"In Memory of F. H. Stainton" (26 subscribers)	25 16 0	
Ladies' Kennel Association	5 5 0	
Lancs Veterinary Association	5 5 0	
Murray, Miss B., and other members (Fees in connection with the Kensington Canine Society)	5 5 0	
North of England Veterinary Medical Association—Social Function 4 0 0		
Dinner Dance 48 0 0		
	52 0 0	
North Wales Division	25 0 0	
Oliver, G. M. G. (*Life Membership*)... ...	10 10 0	
Payne, A. E.	2 2 0	
Richmond Dog Show (Services of F. H. Stainton and other members)	10 10 0	
R.S.P.C.A., Southampton Branch (two donations at £12 10s.)	25 0 0	
Scottish Metropolitan Division	10 0 0	
Veterinary Medical Association of Ireland ...	15 15 0	
West of England Ladies' Kennel Association	5 5 0	
Whicher, A.	0 10 6	
		480 12 10
Collecting Boxes		
Beckett, R. L.	1 5 0	
Brancker, Miss W. M.	4 2 0	
Bruford, J. W.	0 18 6	
Central Veterinary Society (two meetings) ...	5 13 1	
Chambers, F.	2 3 0	
Dumfries and Galloway Veterinary Medical Association	7 17 4	
East Midlands Division	9 1 0	
Furniss, R. H.	0 10 0	
Gillmor, H.	1 1 0	
Herts and Beds Veterinary Society	6 11 3	
Hewer, J. R.	2 0 0	
Hopson, C. G.	3 3 0	
Lancs Veterinary Association	3 15 0	
Lincs and District Division	5 19 9	
Low, J. J.	2 15 0	
Masson, C.	1 0 0	
Midlands Counties Veterinary Association ...	3 17 0	
Mid-West Veterinary Association	13 1 7	
Morton, J. T.	1 3 6	
North of England Veterinary Medical Association	1 9 8	
North of Scotland Division	1 18 4	
North Wales Division	7 15 4	
Pasfield, J.	1 1 0	
Royal Counties V.M.A.	9 11 0	
Scottish Branch, B.V.A.	4 2 0	
Scottish Metropolitan Division	4 2 9	
South-Eastern Veterinary Association ...	9 16 0	
Southern Counties Veterinary Society ...	3 0 7	
Sussex Veterinary Society	4 1 4	
Veterinary Investigation Officers' Conference	4 8 0	
Western Counties Veterinary Association ...	15 4 6	
Whicher, A.	2 19 6	
Wortley, W. H.	0 14 0	
Yorkshire Veterinary Society	10 0 0	
Total from Collecting Boxes	156 1 0	
South Wales Division *Special Collection* ...	34 8 0	
		190 9 0
Total		£671 1 10

February 5th, 1953.

The SECRETARY also added that 15 members whose covenants in respect of annual subscriptions had expired at the end of last year had very kindly completed fresh deeds to cover the ensuing seven years; and that three new covenants had been secured through the good offices of the Secretary of the North of England Veterinary Medical Association.

Life Member.—It was resolved "That Mr. G. M. G. Oliver, M.R.C.V.S., having paid the necessary fee of £10 10s., be elected a Life Member of the Fund."

CHRISTMAS GIFT ACCOUNT

The SECRETARY reported :—

(*a*) That the usual appeal in *The Veterinary Record* early in December resulted in £77 14s. 6d. being received.

(*b*) That since the last meeting of Council the sum of £100 had been received from a member of Council in memory of his wife which he particularly wished to be distributed at Christmas to the beneficiaries of the Fund.

(*c*) That with the above and the £450 presented by the Ladies' Guild (which was duly reported at the September meeting) half of which it was desired should be allocated to Christmas gifts, the Executive Committee, with the concurrence of Mrs. D. I. Glover, Treasurer of the Ladies' Guild, had made the following gifts which were despatched on December 15th :—

£		£
5 at 6	... ...	30
17 „ 8	... ...	136
1 „ 9	... ...	9
11 „ 10	... ...	110
1 „ 15	... ...	15
35 recipients	... ...	£300

In addition, one recipient with young children who was nominated by the President also received a parcel of groceries from a lady member of the profession.

Many letters have been received conveying the recipients' sincere appreciation and cordial thanks to the donors who made such unexpected and welcomed gifts possible.

CASES

No. 52. Widow, aged 75. Two letters, dated January 1st and 31st, having been read, it was resolved "That the Secretary be instructed to reply in the light of the discussions which had taken place in regard to her letters."

No. 141. Widow. The Secretary reported that this recipient died on November 23rd, 1952, at the age of 90.

No. 235. Widow. The Secretary reported that this recipient died on October 23rd, 1952, at the age of 96. The action of the Executive Committee in paying the funeral expenses was approved.

No. 187. Daughter of late member, aged 85. Admitted to hospital on October 1st, 1952. After receiving physiotherapy treatment was transferred to the adjoining Old People's Home, maintained under the National Assistance Act, 1948.

The Executive Committee reported that in the circumstances they had discontinued the grant of £1 per week at the end of 1952 but had made provisional arrangements regarding the rent of cottage.

It was agreed that the Secretary be instructed to arrange for a member of the Ladies' Guild to visit this recipient and report to the Executive Committee.

No. 261. Widow, aged 67. Two adult daughters. The meeting was informed that as this case was due for review, the Secretary had requested the recipient to complete a further form showing her present financial circumstances. This was read to the meeting who thereupon decided to continue the grant of £1 per week but that a report from the Veterinary Medical Association of Ireland should be asked for on this case.

No. 281. Widow, aged 50. Two boys aged 19 and 12. Case brought up for review in accordance with the Council's decision made in January last year.

The Secretary submitted a report received from the Scrutinising Committee of the V.M.A., Ireland, dated December 30th, 1952, in which the Committee supported the continuance of the grant for a further 12 months as her financial position had not improved. It was resolved "That the recommendation of the Scrutinising Committee that the grant be continued and the case be further reviewed in 12 months' time be adopted."

The undermentioned cases, Nos. 286, 287 and 288, having been referred to the Executive Committee, with power to act, by the Council which met on September 26th, 1952, it was resolved "That the action taken by the Executive Committee in these cases be approved."

No. 286. M.R.C.V.S., aged 73. Receiving assistance from the National Assistance Board of £2 2s. per week. The Executive Committee decided to make a grant of 15s. per week from September 1st, 1952, following the reply received to our enquiry from the National Assistance Board as to the maximum amount that could be given without upsetting his pension.

No. 287. M.R.C.V.S., aged 36. Married, one child. Fractured leg and requiring hospital treatment. A representative of the profession in Northern Ireland having submitted a report on his visit to this member in hospital, it was agreed that a grant of £1 per week be made during his six months' stay therein, commencing from October 1st.

No. 288. Widow, aged 71. Husband, late Major, R.A.V.C. The Executive Committee having been informed that her application to the War Office for a compassionate pension had been favourably considered and an award of £2 14s. per week made in her case, it was decided that her grant from the Fund be reduced from 30s. to £1 per week as from January 1st, 1953.

No. 289. Widow, aged 46. One daughter aged 10 years. Application for financial assistance towards daughter's education.

The Secretary reported that the National Veterinary Benevolent and Mutual Defence Society having had a direct application from the widow for financial help, and having knowledge that this Fund had also been approached regarding similar assistance, the Society had suggested that they would be prepared to take over the responsibility of assisting this case. The President, in the circumstances, had therefore agreed on the acceptance of this offer.

It was resolved: (*a*) That the action of the President be approved; (*b*) That a letter be sent to the N.V.B. and M.D.S. expressing the Council's warm appreciation of their kind action in undertaking to be responsible for this case.

No. 290. Widow, aged 54. One daughter, 18, and one son, aged 14. Applicant awaiting admission into hospital for an operation for glaucoma. Owns own house. Total income, including N.H.I. pension, approximately £4 3s. per week. Application for help towards the education of the children. Strongly supported by Professor W. M. Mitchell.

It was resolved "That a grant of £3 per week be made towards the education of the two children and that a report on this case be furnished to the Council in 12 months' time.

Date of Next Meeting.—It was agreed that this should be held at the end of March or early in April but that the actual date be left in the hands of the Executive Officers.

Vote of Thanks.—On the proposition of Professor W. M. Mitchell a hearty vote of thanks was accorded to Mr. H. W. Dawes for his conduct in the chair, and the meeting terminated.

IN PARLIAMENT

Dogs (Protection of Livestock) Bill

Measure Designed to Check Sheep Worrying "Talked Out"

Recent serious cases of sheep worrying, notably in Sussex, provided Mr. William Teeling with an auspicious background for his private member's measure, the Dogs (Protection of Animals) Bill, which being regarded favourably by the Minister of Agriculture and having substantial support among the members of all three parties was expected to secure Second Reading in the House of Commons on Friday of last week. However, much to the indignation of its supporters, the Bill was "talked out."

The recent report of the Goddard Committee on the law of civil liability for damage done by animals (*Vet. Rec.* **65,** 96) recommended, in effect, that the farmer should be entitled to shoot a dog trespassing on his land, even though no actual "attack" could be proved, if he reasonably believed that his animals had been, or would be, injured by the dog, and notice was given to the police within 48 hours after the shooting. Mr. Teeling's Bill did not cover this recommended amendment of the law, but confined itself to creating new offences for which dog-owners might be penalised. For instance, it provided for the punishment, by fines up to £20 for a first offence and of £50 for a repetition thereof, of persons whose dogs are found straying or not under control on any agricultural land and if the dog was or had been worrying livestock on that land.

Mr. Teeling, moving the Second Reading, gave two main reasons for the Bill, the question of cruelty and that of food. One should think of the wretched animal that was being tortured. The effect on food supplies was serious. In his own area of Sussex, between Brighton and Worthing, sheep farming to a very large extent had been given up. Farmers just could not afford to go on with such losses unless some form of protection could be found.

The number of poultry killed in 1949 was 17,161 and in 1942 over 20,000. In 1952 17 cattle were killed and 52 injured. In one year about 7,000 sheep were killed, which meant that about 1,000,000 meat rations were lost.

He had received messages of support for the Bill from Sir William Prince-Smith, the President of the National Sheep Breeders' Association, and from other sources.

Mr. Gooch seconding, said it should not be assumed that the supporters of the Bill were not dog lovers. The Bill had the approval of the farmers and farm workers, and they were as fond of their dogs as anyone. Hundreds

of lambs were stillborn as a result of ewes being chased by dogs. One of the worst effects of worrying and killing by dogs was that it acted as a deterrent to sheep farming. Sheep were being driven away from all districts adjacent to industrial populations.

Sir THOMAS MOORE said it was a good Bill. There were two criticisms in *The Times* that morning, one from Sir Alfred Munnings, who advocated a tax of £5 on dogs—no one would agree with that for it would take away the one solace of many poor people (cheers)—and a second from the Secretary of the Canine Defence League. He (Sir Thomas Moore) had been associated with the League for the last 25 years, but he was not consulted about whether the protest should be made and he wondered how many others were consulted. The R.S.P.C.A., for whom he had authority to speak, were warmly in support of the principles of the Bill.

Mr. HECTOR HUGHES said the House ought not to be stampeded into approving an unnecessary Bill by gruesome and gory stories about sheep worrying.

Mr. GOOCH.—They are true.

Mr. HUGHES said they were true, but in a minority. The dog and his owner were entitled to fair treatment, which the Bill would not give. (Cries of "What about the sheep?") Of course there were delinquent dogs as there were delinquent humans. There were educated dogs and uneducated ones (laughter), there were stupid dogs and clever ones, dogs which were not citizens and dogs which were delinquents. (Renewed laughter.)

The Bill would reduce the rights of dogs—and dogs had rights—to less than those of many wild animals. The Bill also did not touch one of the fundamental problems of the delinquent dog—the question of ownership. Each dog should carry its own licence in the form of a disc attached to the collar. Licences should be issued by the police.

GOVERNMENT SUPPORT

Mr. NUGENT, Parliamentary Secretary, Ministry of Agriculture, said the Government supported the Bill as a valuable contribution to food production. It would also reduce the suffering of sheep and other livestock. In the past year the Minister had had consultations with the organisations and associations concerned, and a fair measure of agreement had been reached. Had it not been for the heavy legislative programme it might have been possible for the Government to have brought forward a similar Bill.

The actual losses of livestock and the number of cases of worrying were only a relatively small aspect of the loss of foodstuffs involved. Far more serious was the increasing number of farmers who would not keep sheep because of the danger of sheep worrying. In his village only one farmer, a Scot, still kept sheep, and he (Mr. Nugent) had decided in 1935 after a serious case not to keep any more. That was typical of thousands, and was a serious aspect which everyone was concerned to check.

Mr. CHAMPION welcomed the Bill, although he was not satisfied that it would provide the remedy. He had doubts about some of the penalties.

Mr. BALDOCK said that some increase in the cost of a dog licence might have a good effect.

Mr. WEST said that those who blamed loss of food production on dogs were talking humbug. Much greater loss of food production was caused by farmers failing to keep their sheep from straying.

The solution of the problem which the supporters of the Bill wanted was that all dogs should be destroyed. (Cries of "Nonsense.") The Bill did not deal with the real difficulty, which was the unidentified dog. The Bill should be withdrawn and reconsidered.

Mr. West was still speaking, amid some interruption, at 4 o'clock when, under the rules of the House, the debate was automatically adjourned.

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QUESTIONS

SLAUGHTER OF HORSES (ENQUIRY)

Sir I. FRASER (March 9th) asked the Minister of Food if he will make a statement as to when he expects the Committee of the Transport and Slaughter of Horses to report; and what interim action has been taken to control or discourage this trade.

Major LLOYD GEORGE: I expect that the report of the Committee of Enquiry into the Slaughter of Horses will be ready during the summer. It would not be appropriate to act in anticipation of the Committee's findings.

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POULTRY IMPORTS (FOWL PEST)

Mr. P. WELLS (March 9th) asked the Minister of Agriculture if he will discontinue the importation of poultry from countries where fowl pest exists.

Mr. NUGENT: The importation of live and dead poultry from countries where fowl pest exists is in general prohibited by Order made under Diseases of Animals Act, 1950. There are, however, special arrangements under which poultry carcases may be imported under licence from a specified area in France and a part of the Union of South Africa which are free from fowl pest, though other parts of those countries are not. These imports are subject to stringent safeguards.

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FOWL PEST

Mr. CROUCH (March 12th) asked the Minister of Agriculture how many outbreaks of fowl pest there have been since the present epidemic started last autumn; how many birds have been destroyed; what has been the amount of compensation paid; if he will give a list of counties that have been affected; and if he is satisfied with the co-operation he is receiving from poultry keepers with regard to the necessary notification of the outbreak of the disease.

Sir T. DUGDALE: Since November 28th last there have been 442 outbreaks of fowl pest. About 199,000 birds have been destroyed; the compensation payable is about £264,000. Outbreaks have occurred in 43 counties in England and Wales—I am circulating a list below. In general, poultry farmers are reporting the disease reasonably promptly, although there have been one or two cases of undue delay.

Following are the counties in which outbreaks have occurred:—

England

Bedford	Isle of Ely	Shropshire
Berkshire	Kent	Somerset
Buckingham	Lancashire	Stafford
Cheshire	Leicester	Suffolk
Derby	Lincoln	Surrey
Devon	London	Sussex
Essex	Middlesex	Warwick
Gloucester	Norfolk	Westmorland
Hampshire	Northampton	Wiltshire
Hereford	Northumberland	Worcester
Hertford	Nottingham	Yorks
Huntingdon	Oxford	

Wales

Brecon	Carmarthen	Pembroke
Caernarvon	Glamorgan	Radnor
Cardigan	Monmouth	

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BULLS AND BOARS (LICENCES)

Mr. P. WELLS (March 12th) asked the Minister of Agriculture when licences in respect of bulls and boars are refused, if he will state the reason to the owners.

Sir T. DUGDALE: Yes. The Acts governing the licensing of bulls and boars require that the grounds for the refusal of a licence shall be given. The letter sent to applicants informing them that a licence has been refused includes a statement giving the reason for the refusal.

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APIARIES (FOUL BROOD DISEASE)

Mr. CROUCH (March 8th) asked the Minister of Agriculture whether he is satisfied that sufficient moneys are being made available for research into American and European foul brood disease in bees.

Sir T. DUGDALE: Research into American and European foul brood disease in bees is limited at present by the difficulty of finding suitable bacteriologists to undertake this work rather than by any shortage of funds.

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FLUORINE GAS INHALATION

Dr. STROSS (March 12th) asked the Minister of Health what information he has of the ill-effect on health from the inhalation of fluorine gas as a by-product of industrial processes.

Mr. IAIN MACLEOD: I have no evidence that such ill-effects are occurring.

Dr. Stross: Is the right hon. Gentleman aware that in my constituency, in the neighbourhood of at least two factories the glass of the factories is etched and rendered opaque, as is also the glass of many of the houses round about, as a result of fluorides which come from the industrial processes? Would he consider going further into this matter and seeing that some research work is done so that we know what is happening to human beings as well as to cattle?

Mr. Macleod: I am aware of the recent incident in which four or five cattle were poisoned in the constituency of the hon. Gentleman, but that seemed to me to confirm the investigation in 1949 by the Medical Research Council into an incident in Inverness, which showed that though there may be, and indeed is, danger to animals, there is no danger, so the M.R.C. advised the Minister then, to human life.

Dr. Stross: But may I ask the Minister to go further into the matter because there is a good deal of circumstantial evidence, which we cannot term strictly scientific, that harm comes to human beings? The right hon. Gentleman has a council, will he ask them to look at it again?

Mr. Macleod: As I have said, the M.R.C. have looked at it, but I will draw their attention to what the hon. Gentleman has said.

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Experiments on Animals

Mr. Peter Freeman (March 12th) asked the Secretary of State for the Home Department the total number of animals subjected to experiments by vivisection since the records were first kept; and of these how many were horses, dogs and cats, separately.

Sir D. Maxwell Fyfe: Records are not kept of the number of animals used, but the total number of experiments for the years 1885 to 1951 inclusive is 26,511,783, including 7,570 experiments on horses, asses and mules, and 113,422 experiments on cats and dogs. The figures for horses, asses, mules, cats and dogs do not include experiments where the animal was killed while still under anaesthesia since separate records were not kept before 1949; nor do they include certain experiments on cats and dogs in 1940 and 1941 since the records were destroyed by enemy action.

NOTES AND NEWS

Diary of Events

March 25th.—Annual General Meeting of the North of England Division, B.V.A., in the Agricultural Lecture Room, King's College, Newcastle upon Tyne, 2 p.m.

March 25th.—Meeting of the Supplementary Register Division, B.V.A., at the Connaught Rooms, Great Queen Street, Kingsway, W.C.2, 2 p.m.

March 26th.—Sixty-ninth Annual General Meeting and the Annual Luncheon of the Western Counties Division, B.V.A., at Exeter (The Imperial Hotel). Proceedings commence 11.30 a.m.

March 27th.—Annual General Meeting of the Biochemical Society, in the Department of Biochemistry, University College, London, W.C.1, 11 a.m.

March 27th.—Meeting of the Lincolnshire and District Division, B.V.A., at Grantham (The George Hotel), 2.15 p.m.

March 27th.—Meeting of the North Wales Division, B.V.A., at Ruthin (Council Chamber), 2 p.m.

April 1st.—The Association of Veterinary Teachers and Research Workers: Joint meeting with the Northern Region, at the University of Liverpool Veterinary Field Station, Leahurst, Windle Hill, Neston, Wirral, Cheshire. Business, 10 a.m.; Symposium on "Skin Diseases," 11 a.m.

April 8th.—Meeting of the Southern Counties Division, B.V.A., at Bournemouth (Grand Hotel), 6.30 p.m.

April 9th.—Meeting of the Section of Comparative Medicine, Royal Society of Medicine, at 1, Wimpole Street, W.1, 6 p.m.

April 11th.—Annual Dinner of the B.R.X. Club, at the Royal Veterinary College, London, N.W.1.

April 25th.—30th Annual General Meeting of the Association of State Veterinary Officers, in the Auditorium of the Wellcome Foundation, 183-193, Euston Road, N.W.1, 2 p.m.

Sept. 6th and 12th.—Seventy-first Annual General Meeting and Congress of the British Veterinary Association, at Aberdeen.

B.V.A. Committee and Council Meetings in Edinburgh

At the Royal (Dick) School of Veterinary Studies.

Monday, April 20th.—11 a.m. Organising Committee.
2 p.m. Parliamentary and Public Relations Committee.
3.30 p.m. Home Appointments Committee.

Tuesday, April 21st.—10 a.m. Veterinary State Medicine Committee.
12 noon Finance Sub-committee.
2.15 p.m. General Purposes and Finance Committee.

Wednesday, April 22nd.—11 a.m. Council meeting.

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XVth International Veterinary Congress

ADDITIONAL FOREIGN CURRENCY

The present limit of foreign currency which a British subject may take abroad is £25. Special Treasury approval will be necessary for any additional currency required by persons attending the XVth International Veterinary Congress in Stockholm. The number of persons who may benefit from these additional facilities is, however, limited. Official delegates sent by Government departments, or with the assistance of such bodies as the Agricultural Research Council, etc., should make application for additional currency facilities through the usual channels.

All other members of the Congress, whether they are representing such bodies as universities, municipal corporations, etc., or whether they are attending privately, if they require foreign currency additional to their basic allowance, should communicate with the Secretary of the United Kingdom Permanent Committee, 9, Red Lion Square, W.C.1, giving full details of whom they are representing, if anybody, and their reasons for requiring such additional currency.

Arrangements have been made for all such applications to be sent by the United Kingdom Committee to the Ministry of Agriculture and Fisheries, who are the sponsoring authority for such applications. It must be understood that no guarantee can be given that any particular application will be successful.

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B.V.A. ANNUAL CONGRESS, 1953

As was intimated in our issue of last week, the provisional programme of the 71st Annual Congress of the British Veterinary Association, to be held in Aberdeen from September 6th to 12th, 1953, will be published shortly. In connection with this event, a list of hotels in which accommodation has been block-booked will be found below. A complete list of accommodation available in Aberdeen may be had on application to the Local Secretary of the Provisional Committee, Mr. Alastair Greig, Rowett Research Institute, Bucksburn, Aberdeenshire.

We publish the list unusually early this year for two reasons. The first is that, while good hotel accommodation in Aberdeen is reasonably plentiful, only a limited proportion is likely to be available to B.V.A. members. The holiday season in Aberdeen is still at its height in September—often the best month of the year—and in this Coronation Year the hotels expect to be particularly busy with overseas visitors.

The second reason is that we believe that many Congress visitors will wish to include the Braemar Games in their visit to the north: this Highland Gathering is to be held on the Thursday preceding Congress week. It is expected that the demand for seating accommodation will be particularly heavy this year owing to the attendance of Coronation visitors, and it is imperative that reservations be made early. Mr. P. L. Shanks, Mill of Craibstone, Bucksburn, Aberdeenshire, has kindly offered to apply for such accom-

modation on behalf of members of the B.V.A. who communicate with him before March 31st next. Prices are as follows:—

Entrance and grandstand seats, 20s. Entrance and ringside seats, 10s. Entrance only, 2s. 6d. (children under 14 free of charge).

Those who wish to join the organised excursion from Aberdeen should also communicate with Mr. Shanks. The return motor-coach fare will be approximately 10s., and arrangements will be made to obtain meals *en route*.

B.V.A. 71st ANNUAL CONGRESS

Aberdeen, September 6th to 12th, 1953

LIST OF HOTELS*

A number of bedrooms in these hotels have been block-booked over the period of the Congress for the use of members of the B.V.A. and their families. Members should make their own individual arrangements with the hotel of their choice, and should mention that they will be visiting Aberdeen in connection with the Congress.

Name and address	Whether licensed	Facilities (see below)	Terms	
			Bed and breakfast	Full board
Caledonian Hotel, Union Terrace	Yes	ABCDG	22/6	11 gns.
Douglas Hotel, Market Street	Yes	ACD	21/- + 10 per cent.	—
Gloucester Hotel, Union Street	Yes	ACD	21/-	—
Imperial Hotel, Stirling Street	Yes	ADF (B some)	18/6 to 21/-	9 gns.
Marcliffe Hotel, Queen's Terrace	No	ABDEG	17/6	from 7 gns.
Northern Hotel, Great Northern Road	Yes	ACDFG	17/6	—
Station Hotel, Guild Street	Yes	ACDG	from 21/-†	from 37/6 per day

A, Hot and cold running water in all bedrooms; B, Gas or electric fires in all bedrooms; C, Central heating; D, Children taken; E, Games room; F, Dogs taken; G, Garage facilities.

* The information given here has been extracted from the Aberdeen Corporation Publicity Department Register of Accommodation, 1952.

† With private bathroom, 35/-. Single suite, £3/17/6, double suite, 5 gns. daily.

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PERSONAL

Appointments.—The following appointments in the Colonial Veterinary Service are announced: Messrs. D. F. Laing, M.R.C.V.S., and F. E. Trevitt, B.V.Sc., as Veterinary Officers, Nigeria; Mr. B. McCulloch, M.R.C.V.S., as Veterinary Research Officer, Tanganyika.

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Births.—Cross.—On March 9th, 1953, at Cambridge, to Audrey, wife of Dr. B. A. Cross, M.A., B.Sc., M.R.C.V.S., a son—Nigel Martyn, brother for Penelope.

Edwards.—On February 24th, 1953, at 12, Kathleen Road, Sutton Coldfield, to Mary, wife of Donald Edwards, M.C., M.R.C.V.S., a son, Peter John.

Ellis.—On January 15th, 1953, at "Strangers' Hospital," Rio de Janeiro, to Mary, wife of Peter R. Ellis, B.Sc., M.R.C.V.S., M.P.H., a daughter, Judith Mary.

Garrett.—On February 25th, 1953, to Pamela (*née* Bridgwater), wife of J. A. Garrett, M.R.C.V.S., Crewkerne, Somerset, a daughter—Janetta Mary.

Hannaford.—On March 5th, 1953, to Joan, wife of P. J. Hannaford, Stevenage, a son—Peter Desmond.

Jack.—On February 15th, 1953, to Auriol, wife of John A. G. Jack, M.R.C.V.S., a son—Andrew David, brother for Sally.

Pinsent.—On March 6th, 1953, at 24, Hawthorn Road, Parkgate, to Constance, wife of James Pinsent, a son.

Cambridge Ph.D. Degree.—Mr. Barry Albert Cross, M.A., B.Sc., M.R.C.V.S., of St. John's College, and Mr. James Leonard Hancock, M.V.Sc. (Liv.), of Christ's College, have secured the degree of Doctor of Philosophy in the University of Cambridge. The title of Mr. Cross's successful dissertation was "An experimental study of the rôle of the neurohypophysis in the milk ejection reflex" and that of Mr. Hancock's thesis "The morphology of spermatozoa." Mr. Cross also secured the Gedge Prize for 1952, this being a monetary prize awarded by the University of Cambridge, for competition every second year, for the best original observations in physiological research or any branch thereof: in this case the same experimental work as that which was the subject of Mr. Cross's Ph.D. dissertation.

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Grave Illness of Dr. W. Horner Andrews.—We learn with deep regret that Dr. W. Horner Andrews, formerly Director of the Veterinary Laboratory of the Ministry of Agriculture at Weybridge and later of the Imperial Bureau of Animal Health, is very seriously ill in South Africa, where he and Mrs. Andrews went to live on his retirement from the Ministry's service three years ago.

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Dutch Veterinary Student.—A Dutch veterinary student (first year only) is about to leave the army and would like to see veterinary practice in England from about April to July this year. Would any veterinary surgeon be kind enough to take this student during the period mentioned and if so, would he kindly notify the General Secretary, B.V.A., 36, Gordon Square, London, W.C.1, as early as possible? The student would very much appreciate it if, also, he could be given board and lodging with the veterinary surgeon.

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French Veterinary Surgeon's Children.—Would any veterinary surgeon be willing to take two children of Professor Godfrain into his home for about three weeks during the months of July or August this year? This is purely for language purposes, the children being a boy aged 13 and a girl aged 16. Professor Godfrain would also be happy to receive in his home the children of a British veterinary surgeon for a similar period. If any member is interested would he please get in touch immediately with the General Secretary of the B.V.A., 36, Gordon Square, London, W.C.1.

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R.C.V.S. OBITUARY

Blyth, Douglas, M.R.C.V.S., Captain late R.A.V.C. (S.R.), of Braintree, Essex. Graduated London, October 26th, 1914. Died March 16th, 1953; aged 59 years.

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The Late Mr. James Brown, M.R.C.V.S.

In connection with the passing of the above esteemed member of the Ministry's staff, recorded in our issue of last week, a colleague writes: "The sudden and tragic death of James Brown was a grievous shock to his colleagues on the staff of the M.A.F. and to his many friends in the profession. He was 36 years; he qualified in Glasgow in 1941, afterwards serving in the R.A.V.C. in the Middle East and Italy. On return to civilian life he saw practice in Darlington and Wickham, and then he joined the Ministry's staff and was stationed in Aylesbury. He was a keen officer, a loyal colleague and a good companion."

Mr. Brown was buried in Aylesbury on March 6th; the funeral was attended by Messrs. A. M. Graham, H. S. Caldwell and A. C. Gillespie; among the many flowers was a wreath from the A.S.V.O.

The sympathy of all members will go out to his widow and father.

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Supply of Laboratory Animals

In its issue of February 21st, *Nature* reports that a meeting of representatives of the supporting societies of the Laboratory Animals Bureau of the Medical Research Council Laboratories, Hampstead, was held at the Royal Society of Medicine on January 22nd, with Dr. R. Lovell in the chair. A paper on "The Supply of Laboratory Animals," by Dr. W. Lane-Petter, the director of the Bureau, had been circulated in advance.

Each year the Home Secretary lays before Parliament a "Return of Experiments performed under the Act 39 and 40 Vict., C. 77" and the numbers rise steadily from 954,691 for 1939 to 1,919,424 for 1951. An analysis of figures obtained from various sources indicates that mice constitute about 79 per cent. of the total number of animals used, involving about 43 per cent. of the total cost of the animals. The corresponding figures for rats are 8 and 9 per cent. respectively, for guinea-pigs 6 and 18 per cent. respectively and, at the other end of the table, for monkeys 0·1 and 7 per cent. respectively. A table gives the main uses for which the various species are required: applied medicine (diagnosis of disease, pregnancy tests, serum preparation, serum

titration, bio-assay and toxicity tests); and research and teaching (physiology, biochemistry, pharmacology, bacteriology and parasitology, endocrinology, nutrition, experimental surgery and teaching). It indicates that research uses the more expensive animals and that applied medicine has adopted the cheaper animals. The behaviour of the animals during their laboratory existence has sometimes shown that it is more economical to buy expensive but healthy animals than cheaper, less healthy ones. Nearly always home breeding is more expensive than buying from dealers (it would be prohibitive for dogs), and the advantages accruing from such must be weighed against the cost. On the other hand, where litter-mate animals are required or animals from parents with a special dietary history, the only reliable way of obtaining them is by home-breeding; and when mice are required for virus chemotherapy or other virological research, they must be produced under conditions too exacting for commercial breeders.

The procuring of animals which are not specially bred by either a commercial breeder or by the laboratory needing them has some difficulties—for example, monkeys are best imported during the warm months, amphibians are most prolific in the late summer, and guinea pigs are often scarce in the early months of the year. Workers may therefore have to plan to carry out their work when supplies are likely to be good. Heavy demands for the more prolific animals, and especially of young ones, can only be met if orders are placed well beforehand to allow extra matings to be made.

It has been suggested that a general breeding station should be established for the supply of animals to the whole of a university or even to groups of universities. This might or might not have some financial advantage; it would certainly have many disadvantages, for, according to a simple principle of public health, the larger the colony the greater the chance of infection coming in and the less the chance of getting rid of it. Another suggestion which can scarcely be taken seriously is that there should be some centralised depôt which would receive animals from all sources and distribute them as needed. The objections to this are the obvious difficulties of controlling the supply and demand, the possibility of infection and the slow adjustment of most animals to change of environment.

On the whole, it appears that most needs can be met from commercial sources and that the acquiring of animals from such sources will be more economical than breeding in the laboratory. It is, however, obviously desirable that some recognised authority should be familiar with the various breeding stations, the strains of animals available and their general condition. It should be able to recommend an alternative source of animals to a worker whose usual source has suddenly become unable to supply his needs. Such a central authority does, in fact, already exist in the Laboratory Animals Bureau. Much has already been done; but much remains to be done to encourage different breeders to produce well-defined strains and perhaps to improve existing strains on the lines used in farm-stock practice for upgrading.

To enlarge the supply of cats and dogs, a strong plea is put forward that the humane societies should hand over the really unwanted and ownerless animals that they acquire, for these societies are in a much stronger position than dealers and laboratory workers for ensuring that the cats and dogs which they collect are, in fact, unwanted and ownerless.

The discussion was opened by Professor R. E. Glover, representing the Royal College of Veterinary Surgeons, who approved of the Bureau's scheme of accreditation of breeders but emphasised the dangers of enlarging colonies beyond the limits of the personal care by the owner. Professor Glover maintained that the use of expensive animals as well as the cheaper ones has to be investigated in order to discover the best animal for the purpose in view. To overcome the difficulty of having a surplus of young animals at a time of year when they are least wanted, a large proportion of these young animals in the glut season should be put to breeding so that the total production should be increased. He thought that decentralisation is distinctly advantageous, but that institutes run by universities on not too large a scale by competent scientific workers would afford a chance of studying animal husbandry and animal diseases; the institutes could train technicians, and each institute might specialise in one or two particular species. He pleaded for more investigations into epidemics in animal colonies; a research worker associated with some institute where he would have contact with clinicians, bacteriologists, etc., would be able to do most valuable work on animal epidemics.

Dr. C. C. N. Vass, representing the Physiological Society, said the difficulty in experiments on cats and dogs is to get them of a known age. If this could be done by paying a higher price, it must be paid, and, since such an animal might be under observation for two years, the high price would be justifiable and in fact almost negligible.

Dr. H. J. Parish, representing the Pathological Society, agreed to the need of using healthy animals at almost any cost, particularly for long-time experiments as are involved in work on prophylactics, which is often done for the benefit of animals and not only for human beings.

Dr. S. J. Folley, representing the Biochemical Society, asked if the possibility of using rats in place of cats and dogs has been considered as carefully as possible; but Dr. Vass replied that, for teaching purposes, the rat is often too small an animal.

In reply, Dr. Lane-Petter said that if breeders' colonies are to be larger, they should be housed in separate small buildings and that, if institutes for animal breeding should be set up by universities, they cannot be expected to produce all the animals needed. He mentioned again the work of the Bureau in visiting commercial breeders and in giving advice on the healthy running of the colonies.

Great appreciation of Dr. Lane-Petter's paper was expressed, and it was unanimously decided that it should be published *in extenso* or even enlarged, if possible in one of the scientific review journals.

[It is of interest to note that the Scientific Sub-committee of the Universities Federation for Animal Welfare have issued a series of suggestions for the legal protection of laboratory animals overseas. These are based on a study of the British Cruelty to Animals Act, 1876, on the licences and certificates issued under the Act, and on the annual return *Experiments on Living Animals* issued by the Home Office. Copies may be obtained on application to UFAW at 284, Regent's Park Road, Finchley, London, N.3. —*Editor.*]

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ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

ANTHRAX:

Cambs.—Barraices Farm, Bourn (Mar. 7). Top Field Farm, Cow Lane, Rampton (Mar. 10).

Ches.—Sandiway Bank Farm, Weaverham, near Northwich (Mar. 7); Green Farm, Thornton-le-Moors, Chester (Mar. 9).

Cornwall.—Buscaverren Farm, Crowan Praze, Cambourne (Mar. 10).

Cumberland.—Lower Scales, Aspatria, Carlisle (Mar. 7).

Derbys.—Lydds Farm, Hognaston, Ashbourne (Mar. 9).

Devons.—Lower Knapp Farm, Sidbury, Sidmouth (Mar. 7).

Leics.—Pontylne Farm, Wanlip Road, Syston (Mar. 11).

Lincs.—63, Greetwell Road, Lincoln (Mar. 11).

Norfolk.—Church Farm, West Bradenham (Mar. 9).

Staffs.—Belmont Farm, Ipstones, Stoke-on-Trent (Mar. 9); Mount Pleasant Farm, Marley Hollows, Hilderstone, Stone (Mar. 11).

FOOT-AND-MOUTH DISEASE:

Beds.—Newhouse Farm, Billington, Leighton Buzzard (Mar. 9).

FOWL PEST:

Berks.—Bradford Farm, March Benham, Newbury (Mar. 12).

Cambs.—Piggery, Hundred Road, March; 119, Norwood Road, March; 48, Bridge Street, Chatteris (Mar. 9).

Herts.—Last Plot, North Orbital Road, Garston, Watford (Mar. 10).

Lancs.—Glenwood, Marshes Lane, Mere Brow, Tarleton, Preston (Mar. 6).

Norfolk.—Castle Farm, Wormegay, King's Lynn (Mar. 7); High Hurn Farm, Horsford, Norwich; High Road Farm, Holme-next-Sea, King's Lynn (Mar. 12).

SWINE FEVER:

Beds.—Remembrance Trust Home Farm, Old Warden, Biggleswade (Mar. 13).

Ches.—Greenfields, Foulk Stapleford, Chester (Mar. 6); Canal Side Farm, Walton, Warrington (Mar. 10); Tanyard Farm, Birch Heath, Tarporley (Mar. 11).

Cornwall.—Trethannas Farm, Praze, Cambourne (Mar. 9).

Essex.—Golding's Farm, Clay Lane, Loughton (Mar. 9); Mitchell's Farm, Little Walden, Saffron Walden; White Elms Farm, Bicknacre, Chelmsford (Mar. 10); Kiln Farm, Southminster (Mar. 11); Wick Farm, Bradwell-on-Sea, Southminster (Mar. 12); Little Renter's Farm, Tolleshunt Major (Mar. 13).

Lancs.—245, Derbyshire Hill Road, St. Helens; Lower Stockbridge Farm, Tatham (Mar. 6); Lane House Café, Trowden, Colne, Lancaster (Mar. 9).

Leics.—Hollygate Farm, Stapleford, Melton Mowbray (Mar. 7).

Lincs.—Waltham House Farm, Louth Road, New Waltham, Grimsby (Mar. 6); 21, Chestnut Terrace, Sutton Bridge, Spalding (Mar. 12).

Norfolk.—Green Farm, Deopham, Attleborough (Mar. 7); West Cottage, Pentney, King's Lynn (Mar. 9); Top Farm, Necton, Swaffham: 2, Home Farm, Hoxne, Diss (Mar. 10); Abbey Farm, Shouldham (Mar. 11); Gissing Farm, South Green, Hoxne, Diss (Mar. 12).

Notts.—Lincoln Street Holdings, Worksop (Mar. 10).

Oxon.—Elmsfield Farm, Worcester Road, Chipping Norton (Mar. 7).

Salop.—Gledrid Works, Weston-Rhyn, Oswestry (Mar. 9).

Staffs.—25, Oakham Fields, Oakham, Dudley (Mar. 6).

Suffolk.—The Row, Hartest, Bury St. Edmunds (Mar. 12); Home Farm, Hopton, Gt. Yarmouth (Mar. 13).

Surrey.—Farleigh House, Farleigh, Warlingham (Mar. 7); Merlewood Farm, Stonehills Road, Stonehills, Chertsey (Mar. 11).

Sussex.—Windmill Farm, Race Hill, Brighton (Mar. 10).

Warwicks.—114, Gracemere Crescent, Hall Green, Birmingham, 28 (Mar. 6); Moat Farm, Woodgate, Quinton, Birmingham (Mar. 7); Holton Street Allotments, Stratford-on-Avon; Tippers Hill Farm, Fillongley, Coventry (Mar. 9); Merryfield Farm, Marcliff, Bidford-on-Avon, Alcester (Mar. 10); 65, Lambeth Road, Kingstanding, Birmingham, 22; Bridge Stores, Hopwood, Birmingham (Mar. 12); Crowley's Oak, Ullenhall, Birmingham (Mar. 13).

Worcs.—Bank Farm, Pedmore, Stourbridge (Mar. 6); Link Elm, Malvern Road, Worcester; Little Horton Farm, Hampton Lovett, Droitwich; "Windrush," Ash Lane, Hopwood; Dropping Wells Farm, Writtenhall, Bawdley (Mar. 9); Church Street, Kempsey, Worcester (Mar. 10); Ryland House, Hartlebury, Kidderminster (Mar. 12).

Yorks.—Huggate Wold Farm, Huggate, York; 1, Clark's Terrace, Heworth, York (Mar. 6); Tyersal Piggeries, Tyersal, Bradford (Mar. 7); Piggeries, Chapel Street, Thirsk; Hare Park Farm, Pudsey Road, Bramley, Leeds (Mar. 9); Mill Lane, Everton, Doncaster (Mar. 10); Church Farm, Meanwood, Leeds 6; No. 1, The Green, Acomb, York (Mar. 11); 2, Queen Street, Mosborough, Sheffield (Mar. 13).

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"B.Sc. (NUTRITION)"

Lord Horder, speaking at a luncheon to celebrate the granting of a Royal Charter to Queen Elizabeth College, University of London, praised a decision to institute courses for a new degree of B.Sc. (Nutrition), and suggested that the creation of a research fund might permit quicker progress in some promising research work begun at the college.

Lord Horder put the science and practice of nutrition in the foremost place among developments in medicine during the past 50 years. His belief was that within the scope of nutrition was the possibility of greater potential gain in human progress, moral and physical, than in any other single contribution of the art and science of medicine.

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THE HARRY STEELE-BODGER MEMORIAL FUND

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CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.

GLYCEROL IN THE TREATMENT OF (1) BOVINE ACETONAEMIA, (2) PREGNANCY TOXAEMIA IN EWES

Sir,—I should be interested to learn what results veterinary surgeons have had this year in the treatment of bovine acetonaemia and pregnancy toxaemia in ewes with glycerol.

Last winter the results obtained in this practice in the former condition were highly satisfactory, all cases except one clearing up with the administration of 13 oz. of glycerol twice daily for two days.

This winter the results have been disappointing; almost all cows treated have given a good initial response, but symptoms have recurred a few days later. Most of these cases have responded to a second or even third course of glycerol, but a few have eventually required glucose injections, or alkaline stomachics, or both.

Even more disappointing has been the response given by ewes affected with twin lamb disease. Last year, as previously recorded, results were very encouraging and high hopes were held for the successful treatment of cases this spring.

This year the condition has not been so widespread in this practice as last year and advice has been sought by only four flock owners. Most of the ewes treated have improved for a few days, then relapsed and either have shown no response to a second course, or, if kept alive long enough, have given birth to dead twins or triplets and died within 24 hours.

Recently a few ewes have been injected subcutaneously with 30 grammes of glucose in one-third of a pint of water in addition to oral dosing with glycerol and have given a very good response so far, but it is too early to reach a conclusion as these ewes have still to lamb.

I hope other practitioners will record their experiences because it is puzzling to find a drug effective one year and very much less so the next.—Yours faithfully, H. Forsyth, Lechlade, Glos. *March 12th*, 1953.

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SURGICAL REPAIR OF TENDONS

Sir,—The two cases of surgical repair of tendons in cats, reported by Miss Joshua, give me cause to report the following case, which, I feel, opens a new field in the concept of tendon surgery.

The case occurred about a year ago when I was practising in Australia, and the subject was a valuable three-year-old Standardbred Trotting mare. She had caught her near hind leg in a noose of plain fencing wire and in her efforts to free herself had caused extensive injuries to the anterior aspect of the metatarsal region. Examination showed an area commencing immediately below the hock joint about 4 inches long and 3 inches wide from which all tissues down to and including the periosteum had been stripped. Both extensor tendons had been "burned out" over this region.

The owner wished any measures to be taken, if only to save the mare for stud purposes. It was obvious that the tendons could not be joined, so it was decided to attempt to graft in a section of tendon. A piece of fresh tendon was obtained, and the mare anaesthetised with chloral hydrate and the operation site prepared. It was immediately perceived that, as it was impossible to find any tissues to cover the area due to the extensive damage, the graft would have no hope of success as it would be impossible to provide a blood supply.

The following operation was then performed. All badly traumatised tissue was removed, and from the two ends of the main extensor tendon, a network of nylon of various thicknesses, was laid down, until the two ends of the tendon were joined with a cord of woven nylon. With the hock joint in a normal position and the fetlock fully extended, a heavy plaster cast was applied from the coronet to about 6 inches above the hock. A shoe was made with three iron rods attached one at the toe and one at either quarter. This fitted over the foot, and the rods were adjusted to give additional rigidity to the fetlock and the whole was incorporated into the original cast with P.O.P. bandage. Tetanus anti-toxin and 3,000,000 units of penicillin were administered. The mare got up after two hours and immediately put her full weight on to the affected leg. She was confined in a loose-box for six weeks, and I must state that she received excellent nursing during the whole period. Penicillin was given at the rate of 3,000,000 units daily for the first seven days, and 1,500,000 units daily for the next seven days. She got up and down quite easily and ate well for the whole period.

After six weeks, the cast was removed. The wound had closed to the size of a florin, leaving a small area of raised granulation tissue. The leg functioned quite well. She remained in the box for a week while the wound healed completely when she was allowed out into a small yard. She immediately gave the leg a severe test by galloping around, bucking violently.

After three weeks in the yard, there was no more lameness and the leg functioned perfectly. There was a small hairless scar, but no thickening. The tendon appeared to have re-formed along the channel of the nylon, and felt perfectly normal.

Exactly four months after the injury, she was taken back into training, and when last heard of, was performing excellently.

There was hardly any smell and very little discharge when the cast was removed. Most of what was present appeared to have come from a pressure sore above the hock. It is probable that the quantity of penicillin used was excessive, at least from an economic point of view, but the mare, instead of being shot was restored to complete function. Had she recovered only far enough to justify her use for stud purposes, the operation would have been economically worth while.—Yours faithfully, Philip M. A. Harwood, Herne Bay, Kent. *March 14th*, 1953.

Advertiser's Announcement

Readers interested in obtaining a copy of a new catalogue of agricultural and veterinary books can obtain one on application to James Thin, the well-known bookseller, of 51-59, South Bridge, Edinburgh.